

references cited in the IDS are listed on the Examiner's PTO-892 form. Therefore, attached are copies of the non-patent references cited in Applicants' July 13, 2001 IDS, together with a copy of Applicants' form PTO-1449 submitted with that IDS. Applicants respectfully request that the Examiner consider the references and initial and return the PTO-1449 form with the next official communication.

Claims 1-8, 11-20, and 22-23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Efron (US 4,755,884).

Claims 9 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Efron in view of Shimpuku (US 5,432,799).

Claim 10 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Efron in view of Smith (US 5,945,932).

Applicants respectfully traverse these rejections in view of the following comments.

#### Discussion of Efron

Claims 1-8, 11-20, and 22-23 are rejected as being anticipated by Efron. This rejection is respectfully traversed. An anticipation rejection requires that each and every element of the claimed invention as set forth in the claim be provided in the cited reference. See *Akamai Technologies Inc. v. Cable & Wireless Internet Services Inc.*, 68 USPQ2d 1186 (CA FC 2003), and cases cited therein. As discussed in detail below, Efron does not meet the requirements for an anticipation rejection.

Efron discloses a technique for analyzing signal transferring characteristics of a signal processing unit such as a recording medium, amplifier, circuit board, or the like. Evaluation of the signal processing unit is accomplished by establishing an input signal of known content, measuring selected parameters of selected parts of the input signal, feeding the input signal to the unit under test, measuring the parameters of parts of the output signal from the unit under test corresponding to the same selected parts of the input signal, and comparing the selected parts of the input signal with the selected parts of the output signal (Col. 7, lines 17-27).

Independent Claims 1 and 22

In contrast to the techniques disclosed in Efron, Applicants' claimed invention, as set forth in claims 1 and 22, estimates the nature and/or amount of processing applied to a signal by measuring the deterioration of a watermark embedded in the signal. There is no disclosure of watermarking in Efron. Efron merely compares known parameters of portions of the input signal and with measured parameters of the same portions of the output signal. In Efron, these parameters are also referred to as a "signature" (Col. 8, lines 13-19). The "signature" of Efron is not equivalent the embedded watermark claimed by Applicants.

A watermark is an auxiliary signal that is embedded into a host or cover signal such that the watermark (auxiliary signal) is substantially imperceptible. Watermarking may be used to provide protection of digital content, such as audio and video files, against piracy. In

Applicants' claimed invention, a watermark with a degree of redundancy is embedded in a signal to provide a steganographic signal. A steganographic signal is a clear signal in which the watermark is substantially imperceptible (see, e.g., Applicants' specification, page 11, lines 15-26). This watermark is designed to degrade gracefully when the signal is subject to processing, but the watermark still remains readable due to the redundancy of the watermark (see, e.g., Applicants' specification, page 7, lines 11-18).

Therefore, with Applicants' claimed invention, there is no need to compare original input parameters of the signal with measured output parameters as in Efron. In contrast with Efron, due to the redundancy of the embedded watermark claimed by Applicant, the estimation of the nature and/or amount of processing can be accomplished blindly (i.e., without knowledge of the input content). The degree of redundancy of the embedded watermark enables recovery of the watermark from the processed signal. For example, the watermark information (e.g., represented by a plurality of data bits) may be repeated hundreds of times. Even if a high percentage of these data bits are destroyed through processing of the signal, it is still possible to reliably recover data bits making up the watermark from the processed signal, due to the high degree of redundancy of the data bits in the original signal. Once the data bits of the original watermark are recovered, the estimation of the processing can be made based on the percentage of incorrect bits in the raw data stream comprising the watermark and deriving a bit-error-rate measurement (BER) therefrom (see,

e.g., Applicants' specification, page 14, lines 10-23). This BER can be used to estimate the nature and/or amount of processing of the signal.

Efron does not disclose or remotely suggest Applicants' technique for estimating the nature and/or amount of processing applied to a signal as set forth in Applicants' claims 1 and 22. In particular, Efron does not disclose or remotely suggest the concept of watermarking (embedding a watermark into a host signal) as claimed by Applicants. Further, Efron does not disclose or remotely suggest measuring the deterioration of an embedded watermark in the signal after the signal undergoes processing and estimating the nature and/or amount of processing based on the measured deterioration of the embedded watermark, as claimed by Applicants.

Further, with Applicants' claimed invention, the measurement of the deterioration of the embedded watermarking may be also used to detect piracy (i.e., unauthorized copying) of the signal containing the watermark. For example, a degraded watermark in a signal may indicate that the signal is an unauthorized copy and not an authorized version of the signal. The method of Efron does not provide such advantages, as there is no hidden watermarking data embedded in the signal of Efron.

Independent claims 13 and 23

Applicants' independent claim 13 provides a method for providing a signal with a watermark layer. Applicants' independent claim 23 is a corresponding apparatus claim. Applicants' claimed technique for providing a signal with a watermark layer involves analyzing an intrinsic frequency

of the signal which is a carrier of the watermark layer and determining a fragility profile in response to the analyzing. The fragility profile is a model or function that relates a degradation measure of the watermark layer to a degradation measure of the signal that carries the watermark.

As discussed above, Efron does not relate to watermarking technology. In fact, the disclosure of Efron does not even mention watermarking. The cited portions of Efron relied on by the Examiner in rejecting claims 13 and 23, column 8, lines 65-68 and column 9, lines 5-10, relate to examination of the "signature" of the signal. As discussed above, the term "signature" as used in Efron relates only to measured parameters of a known signal. The "signature" of Efron is not equivalent to an embedded watermark as is apparently assumed by the Examiner.

Therefore, Efron does not disclose or remotely suggest the features of Applicants' claims 13 and 23.

As Efron does not disclose each and every element of the invention as claimed in claims 1-8, 11-20, and 22-23, the rejections under 35 U.S.C. § 102(e) are believed to be improper, and withdrawal of the rejections is respectfully requested. See, *Akamai Technologies Inc., supra*.

#### Discussion of Shimpuku

Claims 9 and 21 are rejected as being unpatentable over Efron in view of Shimpuku. Shimpuku does not cure the above-noted deficiencies of Efron. Like Efron, Shimpuku

does not disclose or remotely suggest any form of watermarking technology.

Applicants' claims 9 and 21 specify that the fragility profile of the embedded watermark denotes a relationship between a bit error rate of the watermark and a signal to noise ratio of the steganographic signal. A "fragile watermark" is particular type of watermark which disappears when the host signal is processed (see, e.g., Applicants' specification, page 3, lines 2-8). With Applicants' claimed invention, the concept of a fragile watermark is extended to provide a watermark which degrades gracefully and predictably as the host signal in which it is embedded is processed, rather than completely disappearing after arbitrary manipulation of the host signal (see, e.g., Applicants' specification, page 5, lines 9-25).

Shimpuku is far removed from Applicants' claimed concept of measuring the degradation of an embedded watermark which has a fragility profile denoting a relationship between a bit error rate of the watermark and a signal to noise ratio of the steganographic signal, as claimed by Applicants. To the contrary, Shimpuku is concerned with minimum run length codes for optical disc recordings. To determine the minimum run length codes, the relationship between signal-to-noise (S/N) ratio and bit-error-rate (BER) is examined. However, Shimpuku's use of the relationship between S/N and BER has nothing to do with a fragility profile which is used to measure the deterioration of an embedded watermark, as claimed by Applicants.

Neither Efron nor Shimpuku disclose or remotely suggest measuring the deterioration of an embedded watermark to estimate the nature and/or amount of processing of the signal carrying the embedded watermark, as claimed by Applicants. Therefore, combining of the teachings of Efron and Shimpuku as suggested by the Examiner would not have led one skilled in the art to Applicants' invention as set forth in claims 9 and 21.

Applicants respectfully submit that the present invention is not anticipated by and would not have been obvious in view of Efron, taken alone or in combination with Shimpuku or Smith, or any of the other prior art of record.

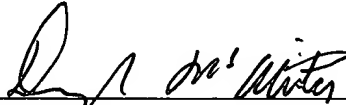
Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Withdrawal of the rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) is therefore respectfully requested.

Conclusion

The Examiner is respectfully requested to reconsider this application, allow each of the pending claims and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicants' undersigned attorney.

Respectfully submitted,



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